

## REMARKS

In accordance with the foregoing, claim 14 has been amended. Claims 1-16 are pending and under consideration.

Claims 1 and 6-13 are rejected under 35 USC § 103(a) as being obvious over U.S. Patent No. 5,940,529 to Buckley in view of U.S. Patent No. 5,119,816 to Gevins and Arroyo et al., "A Modular Software Real-Time Brain Wave Detection System" (April 1982).

Claims 2 and 3 are rejected under 35 USC § 103(a) as being obvious over Buckley in view of "Cooley et al." Arroyo et al. and Pang et al., "Generalization and Comparison of Alopex Learning Algorithm and Random Optimization Method for Neural Networks" (May 1998). In referring to Cooley et al., it is presumed that the Examiner is referring to a 1997 IEEE reference entitled "Combining Structural and Spectral Information for Discrimination using Pulse Coupled Neural Networks in Multispectral and Hyperspectral Data." Claims 4 and 5 are rejected as being obvious over Buckley in view of Gevins, Cooley et al., Arroyo et al. and Deco et al., "Information Transmission and Temporal Code and Central Spiking Neurons" (December 1997). Claims 14-16 are rejected as being obvious over Gevins in view of Arroyo et al.

On April 18, 2005, Examiners Bell, Knight and Starks kindly granted the undersigned a personal interview in the U.S. Patent and Trademark Office. The Examiners' time in preparing for and conducting the interview is gratefully appreciated.

During the interview, it was argued that Buckley, which was cited for the pulsed neural network limitations, relates to self-organizing circuits. Self-organizing circuits and neural networks belong to different fields of scientific research. It would not have been obvious to one having ordinary skill in the art to modify Buckley as taught by Gevins and Arroyo. Research in self-organizing circuits is published in different journals and presented at different conferences from research on neural networks. Whereas self-organizing circuits perform Boolean operations, neural networks process complex numerical functions based on real numbers. Furthermore, self-organizing circuits do not offer the dynamic architecture of neural networks, even if they have a flexible design.

Buckley is deficient. None of the references disclose or suggest the claim limitations regarding pulsed neural networks.

With regard to Gevins, column 13, lines 43-46 state "Pulse widths of 0.25 to 1 microseconds are used with burst frequencies of 2 to 10 MHz, adjusted to produce the best discrimination between the two echoes." Although Gevins mentions adjusting something,

mentions pulse widths and mentions producing a discrimination, it is submitted that this portion of the reference is deficient. The claims refer to a discrimination value. Page 14, lines 9-14 of the substitute specification indicate the discrimination value describes the reliability of a classification that is performed by the neural networks. Page 13, lines 7-10 of the substitute specification states that it is a goal to minimize the necessary supply of data input while maintaining optimal classification reliability. A detailed mathematical definition of the discrimination value is given in the substitute specification on pages 19 and 20.

The relationship between a time span and the discrimination value is described in the application (not necessarily claimed) as follows: During each time span, input data is supplied to the neural network to train classification. The longer the time span, the more input data can be supplied to the neural network and the better the classification would be. Good classification is reflected by a large discrimination value. According to the method proposed by the inventors, the time span is shortened in each training step. However, the inventors ensure that the discrimination value, which represents the quality of the classification, does not degenerate. In the end, the trained neural network can perform optimal classification based on minimal data input. This is the training objective.

As the discrimination value is calculated based on pulses of pulsed neurons of the neural network, it is clear that the unique characteristics of pulsed neural networks are essential to the classification and the invention. However, these essential characteristics cannot be found in Buckley or Gevin.

The claimed invention refers to a shortening a second time span. Gevins does not mention anything about shortening a time span. Column 13, lines 43-46 indicates that something is being adjusted. However, the sentence is not clear whether pulse widths or frequencies are being adjusted. Furthermore, even if pulse widths are being adjusted, Gevins does not teach pulse widths being shortened until a new discrimination value disagrees with an old discrimination value. Still further, it is not believed that the "pulse widths" referred to by Gevins are equivalent to the claimed time span. In Gevins, it appears that the pulse widths relate to the wave characteristics of a signal supplied to the skull of a patient. The pulse widths may have nothing to do with a time span as envisioned by the application. Independent claim 14 has been amended to refer to time spans of data input. Clearly, the pulse widths of Gevins are not time spans of data input.

None of the other references relied upon by the Examiner compensate for the deficiencies discussed above with regard to Buckley and Gevins, and therefore the prior art

rejections should be withdrawn.

The application should be allowed. However, if a new ground of rejection is applied, Applicants' amendments did not necessitate this new ground of rejection. Even though claim 14 has been amended, the rejection was defective before the claim changes. At the least, the references relied upon to reject claim 14 did not suggest the pulsed neural network limitations. Because the rejections in the January 21, 2005 Office Action were defective, the next Office Action (if the case is not allowed as it should be) should be a non-final Office Action.

It should be noted that each of the claims relate to a tangible object, a pulsed neural network. The claims are not directed to an abstract algorithm.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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Date: Apr. 21 2005

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**CERTIFICATE UNDER 37 CFR 1.8(a)**  
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on April 21, 2005  
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